Intro Stat: 3.1 notes

Using the sticky note given as your "dot," put your height on the dotplot on the board.

- What percent of the students in our class are SHORTER than you???

me = 67" $\frac{13}{28} = 0.4643 = 46.43\%$

- Calculate the mean and standard deviation of the class heights (use your calculator)

$\bar{x} = 67.82$" $s = 4.155$"

- Where does your height fall? Above or below the mean?

below, by a little

- How many standard deviations above or below the mean is your height?

less than 1.

VOCAB:

Percentile:

If an observation is in the p^th^ percentile, it means that...

the observation was at or higher than p% of the data

So if you score in the 80% percentile on your test, this means that...

you did same or better than 80% of class

Standardizing Observations

1) You are in a history class and a math class. You take your chapter 1 test in both classes on the same day, and get them both back a few days later. Your grades are as follows. Which class did you do better in?

History: 81% *Math: 75%*

2) Same scenario. However, each teacher tells you a bit about how your class did. Which class did you do better in?

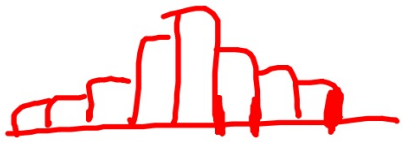
History: 81% *Math: 75%*

mean: 76% *mean: 70%*

5% < 5% Same

3) Same scenario. However how your teacher gives you the class standard deviations. Which class did you do better in?

History: 81%	*Math: 75%*
mean: 76%	*mean: 70%*
std. dev: 8%	*std. dev: 2.5%*



Standardizing Observations

Question: How can we compare one distribution to another distribution if they don't have the same parameters (mean and std. dev)?

Answer: compare an obs. to its mean & its std. dev.

To standardize:

- measure observations.... in how many std. dev.'s above mean
- Z-score $\rightarrow$ $z = \frac{x - \bar{x}}{s}$
- Z- score tells us... how many s above/below the $\bar{x}$

$z_{math} = \frac{75 - 70}{2.5} = +2s$

* Get lists BOOKS, DICE, SODA on your calculator

* Try the following:

A student took the ACT and scored a 25. They also took the SAT and scored a 1210. Which test did they do better on? The ACTs have a mean of 20.8 and a standard deviation of 4.8. The SATs have a mean of 1020 and a standard deviation of 210.

ACT

$$z = \frac{25 - 20.8}{4.8}$$

$z = 0.875$ s

SAT

$$z = \frac{1210 - 1020}{210}$$

$z = 0.905$ s

Example: The heights of 18-24 year old women are distributed with the following:

μ = 64.5" and σ = 2.5"

μ = mean of a pop.

$\bar{x}$ = mean of sample

We know a woman who is 69" tall. How does she compare to the rest of the women in her age group? Calculate her z score, and interpret what it means.

σ = sigma = std. dev. of pop.

s = std. dev. of sample

$$Z = \frac{69 - 64.5}{2.5} = 1.8$$

Example: We also know a man who is 71" tall. Who is taller relatively? Men are known to be distributed with a mean of 67" and a std. deviation of 2.3 inches.

$$Z = \frac{71 - 67}{2.3} = 1.74$$

Complete the following from the book:

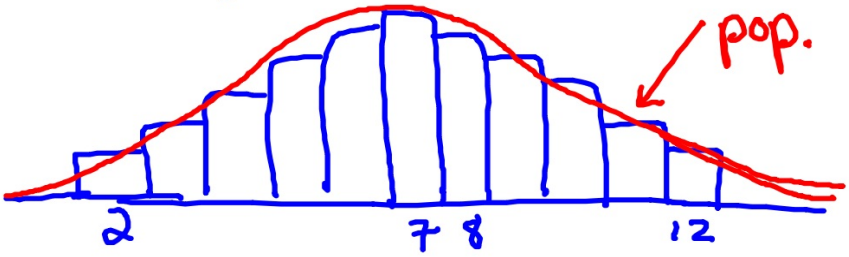
p. 105 #1a, 2b, 5

$$z = \frac{6{,}350{,}000 - 3388617}{3767484}$$

$$= 0.786$$

Think back to the dice experiment....

What SHOULD the histogram have looked like?? Draw it



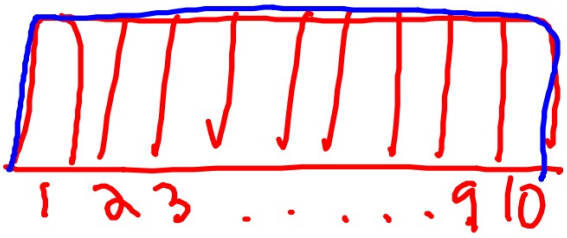
n=30

n=777

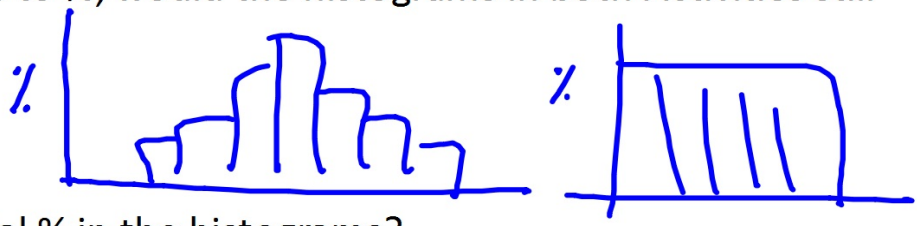
Draw a smooth curve over the histogram. What does this look like?

Now think back to the random number experiment....

What SHOULD that histogram have looked like? Draw a smooth curve over this histogram.

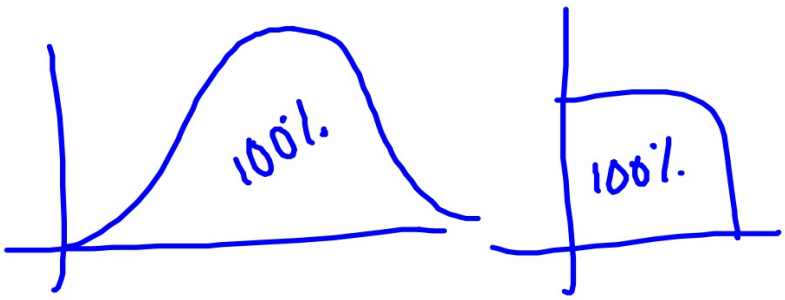


If I converted the y-axis to %, would the histograms in both Activities still look the same?



What would be the total % in the histograms?

100%.



DENSITY CURVES

- A smooth curve that ...

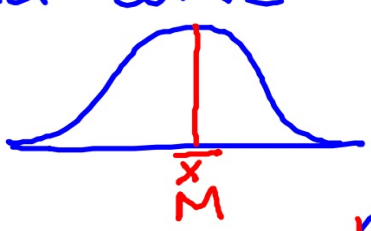
estimates the shape/distribution of pop.

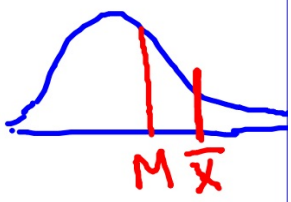
- Can be any shape

- Must have an area ...

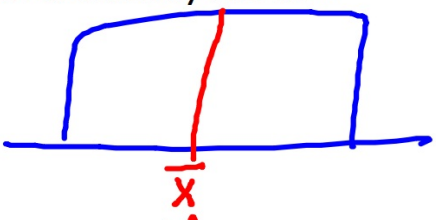
of 100% under curve

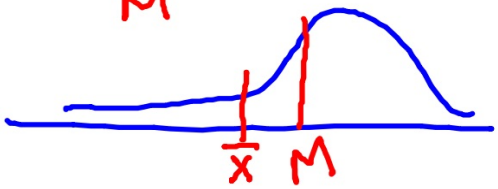
- MEDIAN of a density curve =





- MEAN of a density curve =

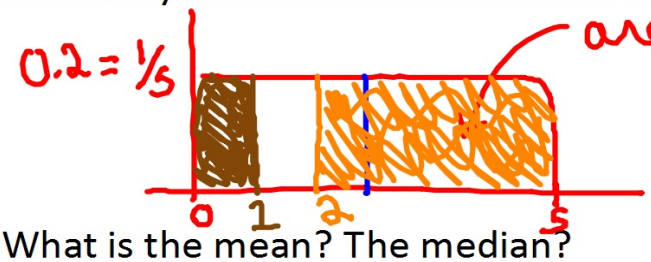


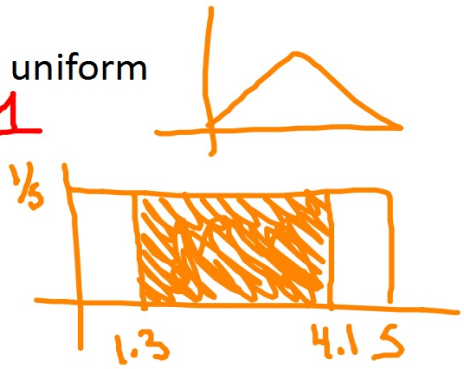


See page 110 in book!

Example: 100% = 1.00

Draw a density curve that has a width of 5 and is uniform





a. What is the mean? The median?

2.5

b. What % of data is below 1?

(1)(0.20) = 0.20 = 20%

c. What percent of data is above 2?

(3)(0.20) = 0.60 = 60%

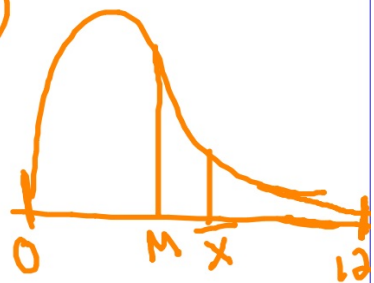
d. What percent of data is between 1.3 and 4.1?

(2.8)(0.20) = 0.56 = 56%

Complete the following from the book: p. 111 # 8, 9, 10

(8)

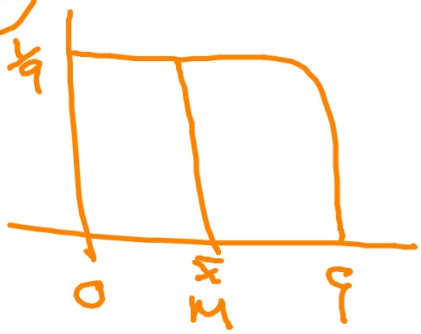
(9)



pop

$(0.4)(\frac{1}{2}) = 0.20 = 20\%$

(10)



$M = 1$

$Q_1 = 0.5$

$Q_3 = 1.5$

Complete Application 3.1 and turn in your answers!

You will need lists DICE, BOOKS, and SODA